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Gadolinium reaction

6/15/2007

**Q.** I have a patient who had an anaphylactic reaction to Gadolinium and he needs this material for a follow-up brain scan. Are there any pretreatment regimens available? (The neurologist told him his only option is a digital subtraction angiogram with I.V. contrast). However, this procedure carries a 1% risk of stroke which the patient wants to avoid. Thank you for your help.

**A.** As you likely know, anaphylactic/anaphylactoid reactions to gadolinium agents have been occasionally reported but are quite rare. One report concluded that the inciting agent was the particular gadolinium component (gadoterate in their case) and not the meglumine component found in most such gadolinium agents (see enclosed abstract). Therefore, one might want to try a different gadolinium agent than the one thought to be the cause of the previous anaphylactic reaction in your patient.

I am not aware of any published report of a pre-treatment regimen preventing such reactions. However, the manufacturers of the agent being considered for repeat study should be contacted to see if they have any reports of pre-treatment protocols in their database.

: Allerg Immunol (Paris). 2003 Dec;35(10):382-5.Links

**Anaphylactic shock induced by gadoterate meglumine (DOTAREM).**

**Beaudouin E, Kanny G, Blanloeil Y, Guilloux L, Renaudin JM, Moneret-Vautrin DA.**

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The use of contrast agent for magnetic resonance imaging improves the effectiveness of this diagnostic examination. Complexes of gadolinium, which appear to be well tolerated, are used for this purpose. A few cases of anaphylactic shock have been attributed to these agents. We report a case of anaphylactic shock due to gadoterate meglumine (DOTAREM). While undergoing a magnetic resonance imaging examination, a 33-year-old nonatopic female patient became severely hypotensive, lost consciousness, and had generalized erythema immediately after the intravenous injection of this product. She recovered rapidly after she was given injection of epinephrine and her blood volume was restored with intravenous fluids. That DOTAREM had caused this immediate hypersensitivity reaction was proven by the positivity of prick-test and intradermal test at 10-3 (0.37 mg/ml) and in vitro leukocyte histamine release test. The results of these tests indicated that it was the gadoteric acid rather than the meglumine component of DOTAREM that was responsible: positivity of IDR at 10 mg/ml. Skin tests and leukocyte histamine release test to gadopentetate dimeglumine (MAGNEVIST) were negative. In addition of the exceptional character, this observation provides evidence for an immediate hypersensitivity without cross reactivity with gadopentetate dimeglumine.

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Mechanism of action of reactions to gadolinium

2/11/2009

**Q. I have a patient who developed urticaria with Gadolinium for MRI- Is this anaphylactoid or and IgE mediated reaction?**

**A.** Reactions to gadolinium have been reported in the literature for more than a decade. I do not believe there is consensus as to whether or not these are IgE-mediated. There are data to support non-IgE as well as IgE-mediated mechanisms to account for these reactions.

I am copying below several references/abstracts that discuss this issue. These references favor the theory that these reactions are IgE-mediated. The discussion within them will give you more information about alternative mechanisms as well.

Thank you again for your inquiry and I hope this response has been helpful to you.

**Abstract 1:**

Anaphylactic shock after first exposure to gadoterate meglumine: Two case reports documented by positive allergy assessment J Allergy Clin Immunol Volume 121, Issue 2, Pages 527-528 (February 2008 ) To the Editor:

We report 2 cases of life-threatening anaphylactic reactions to gadoterate meglumine (Gd-DOTA) documented by positive skin test results. Since the first marketing authorization of gadopentetate dimeglumine (Gd-DTPA) in the United States, Europe, and Japan in 1988, gadolinium-based contrast agents have been widely used, and they currently account for approximately 30% of all magnetic resonance imaging (MRI) procedures. Anaphylactic shock induced by gadolinium-containing products is rare: incidence ranges from 0.004% to 0.01%.<sup>1, 2</sup> Gd-DOTA is an ionic cyclic gadolinium-containing product with high osmolality. Systemic anaphylaxis reactions to Gd-DTPA were first described in 1990.<sup>3</sup> A patient with history of asthma and anaphylactic shock to iodinated contrast media presented laryngeal and facial edema minutes after intravenous injection of Gd-DTPA. Since this early report, some severe cases of anaphylactoid reactions (grade III to IV) caused by Gd-DTPA<sup>4</sup> or to Gd-DOTA<sup>5</sup> have been documented in the literature. A case of allergic anaphylaxis caused by Gd-DOTA documented by positive skin tests and leukocyte histamine release test (LHRT) has been previously reported.<sup>6</sup>

## Abstract 2:

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### Case Report

Anaphylaxis to Gadobenate Dimeglumine (Multihance®): A Case Report

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Int Arch Allergy Immunol 2007;144:150-154 (DOI: 10.1159/000103227)

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### Key Words

Gadobenate dimeglumine

Skin testing

Anaphylaxis

Adverse reaction

Multihance®

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### Abstract

**Background:** Gadolinium chelates are relatively safe contrast media used in MRI. Immediate severe adverse effects are exceptionally rare and mostly concern mild anaphylactoid reactions. We report a case of anaphylaxis to gadobenate dimeglumine (Gd-BOPTA, Multihance®), a gadolinium-based contrast agent. **Methods:** A 32-year-old female patient with a personal history of multiple sclerosis, while undergoing an MRI scan, developed bronchospasm and acute urticaria with diffuse giant pruritic plaques in the first minute of Gd-BOPTA infusion. The procedure was cancelled and acute treatment of the reaction took place. The patient reported 2 additional MRI scans with definite use of unknown contrast media in the past 2 years without any adverse effect. Blood samples were obtained 2 and 48 h after the reaction for measurement of serum tryptase concentration (Pharmacia Diagnostics, Uppsala, Sweden). Skin prick tests and intradermal tests were performed using 1:1,000, 1:100 and 1:10 dilution of the offending agent and alternative gadolinium-based agents [gadodiamide (Omniscan®) and gadoteric acid (Dotarem®)]. A group of 10 nonatopic individuals who underwent the same skin testing comprised the control group. **Results:** Tryptase concentration was highly elevated 2 h after the reaction (21 µg/l) compared with that at 48 h (3 µg/l). Skin prick tests in our patient were all negative, while intradermal testing with 0.03 ml of 1:100 and 1:10 preparations of Multihance showed a definite positive wheal-and-flare reaction. Skin tests to the alternative agents showed no response. In the control group, all performed tests were negative. **Conclusion:** We report the first case of an allergic reaction to

gadobenate dimeglumine. Besides, skin testing seems to be a precious diagnostic tool which, if positive, strongly suggests a mast cell-mediated underlying mechanism.

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